

MECHANISM OF ELECTROMIGRATION FAILURE IN AL THIN INTERCONNECT LINES CONTAINING SC

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The addition of alloying elements to Al interconnects is known to influence the kinetics of electromigration (EM) failure. For example, the addition of Cu can increase the lifetime of Al interconnects by several orders of magnitude. The exact mechanism behind this improvement, as well as those due to other alloying elements, is not well understood. In order to determine the mechanisms, it is imperative to study the EM mechanism in various alloy systems. For this purpose, we investigated the EM behavior of binary alloys containing Sc. Al-0.08 wt.% Sc thin films were prepared and subjected to EM testing. Special attention was devoted to the dissolution and growth of Al-Sc precipitates during EM, since they were found to be important in understanding the role of solutes. This paper presents our observations on the Al-Sc system and compares the results to those on the Al-Cu system.

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